

Evaporation

During the 1950s scientists became interested in obtaining evaporation readings in Death Valley given the extreme climate. The United States Geological Survey (USGS) wanted readings of evaporation in desert areas of California for use in research and at the time, none were being made. The USGS persuaded the United States Weather Bureau to add evaporation equipment to Death Valley in a meeting in February 1958 and also arranged to have the National Park Service staff take the readings at no cost. The original anemometer was provided by the National Park Service while the United States Weather Bureau provided an evaporation pan for the cost of \$10.25.

At the time, the National Park Service in Death Valley largely operated in the Cow Creek area of the Park, which already had a cooperative weather station established. The Greenland Ranch station was not taking observations in early 1958. Therefore the initial evaporation station was installed at the Cow Creek site and became operational on April 16, 1958. Evaporation readings continued at Cow Creek until April 25, 1961 when the entire Cow Creek weather station was permanently closed. The evaporation station was then moved to Furnace Creek and placed at the existing cooperative weather station there that same day.

Evaporation readings are made at Death Valley once a day at the time of observation along with the collection of maximum and minimum air temperatures and precipitation for the observation period. Wind movement and readings of the high and low water temperature are also collected as part of the evaporation reading.

Total evaporation has always exceeded 100 inches a year at Death Valley since records started at Furnace Creek. However, a marked decline in the total evaporation can be seen since the start of records. The highest evaporation occurs during the summer months when air temperatures are the highest along with the sun angle while the lowest evaporation takes place during the months of December and January when the sun angle is lowest and air temperatures are usually the coldest. The highest total evaporation was in 1964 when 177.12 inches was recorded. The lowest total was 116.66 inches in 1998. The highest daily evaporation rate reported was on May 18, 1961 when 1.95 inches of water evaporated. However, some caution should be taken with respect to this value as the previous two days that month had no evaporation reading reported.

Values listed in the total evaporation by month and year were in some cases adjusted by the National Climatic Data Center to the entire month where a few days of data were missing. Starting in 2011, however, the former National Climatic Data Center (now NOAA's National Centers for Environmental Information) discontinued this practice as a part of a standard policy to no longer adjust observer totals. Therefore the totals listed in 2011 are the total of the

observed values listed by the observers on the B-92 form used to report evaporation.

Evaporation readings have been manually taken since the start of observations. Due to the warm climate of Death Valley, the water in the evaporation pan rarely freezes for a significant amount of time with exceptions such as December 1990. During periods where the pan freezes, no readings are made. One large period where evaporation readings are missing is from June 1987 through February 1988. From June through September of 1987, the evaporation readings at Death Valley began to develop a noticeable low bias. These readings were initially not pulled from published records by the former National Climatic Data Center. In October 1987, the low bias became evident and the readings were removed from the published record.

With the change to the automated station on November 2, 2015, evaporation data ceased being collected in Death Valley with the morning observation on this date. The current evaporation pan and wind sensor were removed. Collection of this data was considered a labor intensive task for the park rangers to collect on a daily basis with the remainder of the observation being automated.